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Patentanmeldung Nr. Patent application No. Demande de brevet n°

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Bezeichnung der Erfindung/Title of the invention/Titre de l'invention:
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A lamp and a method for attaching a burner to a cap of lamp

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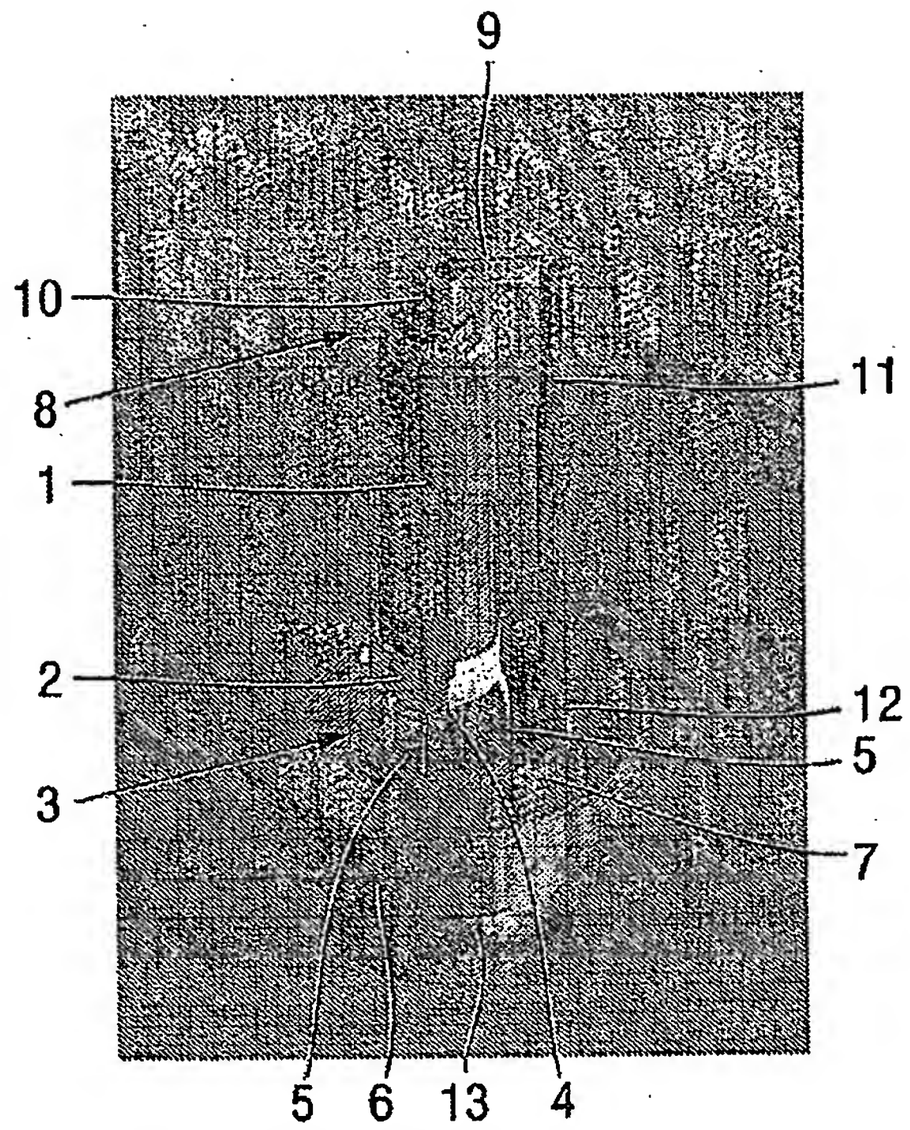

FIG.1

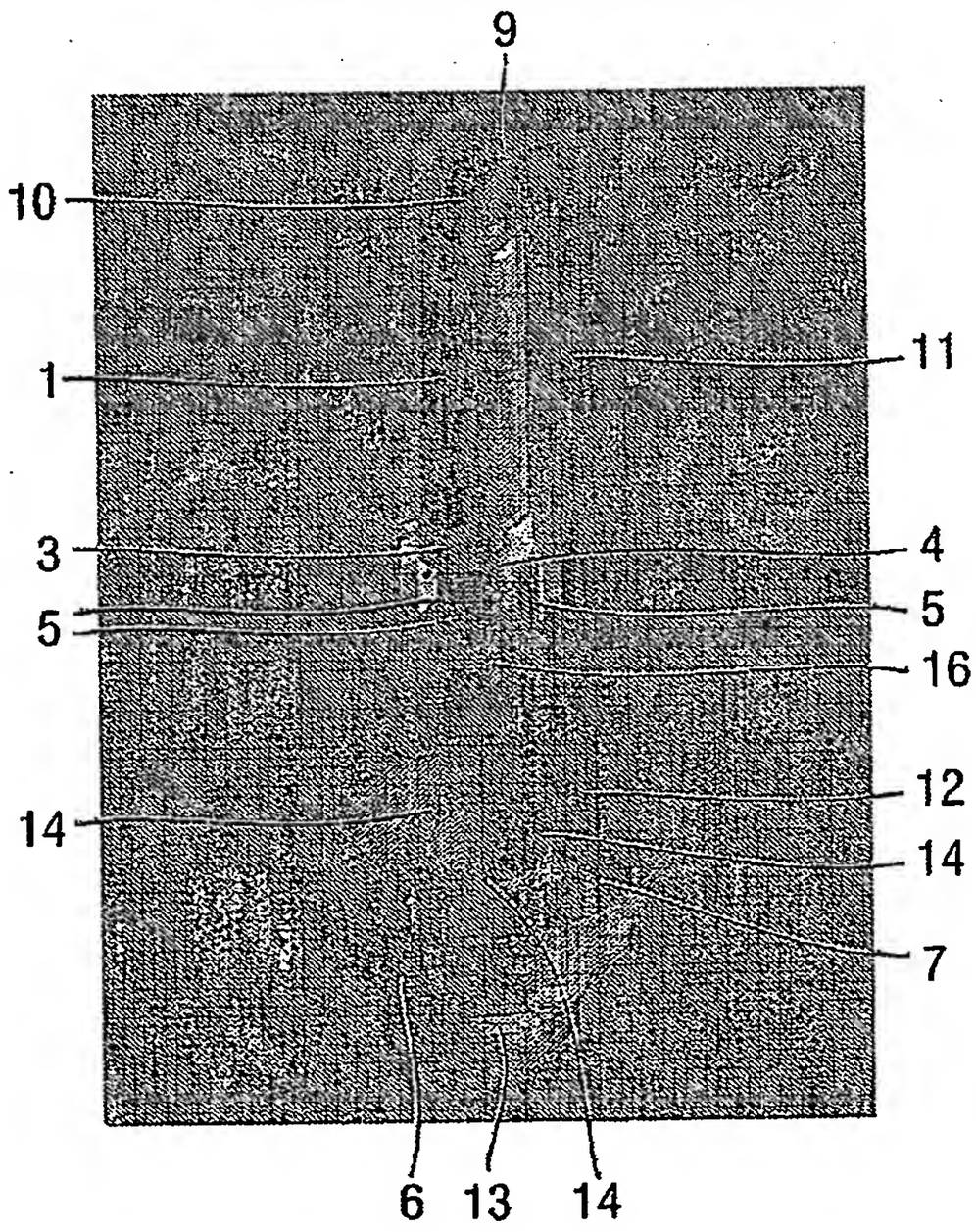

FIG.2

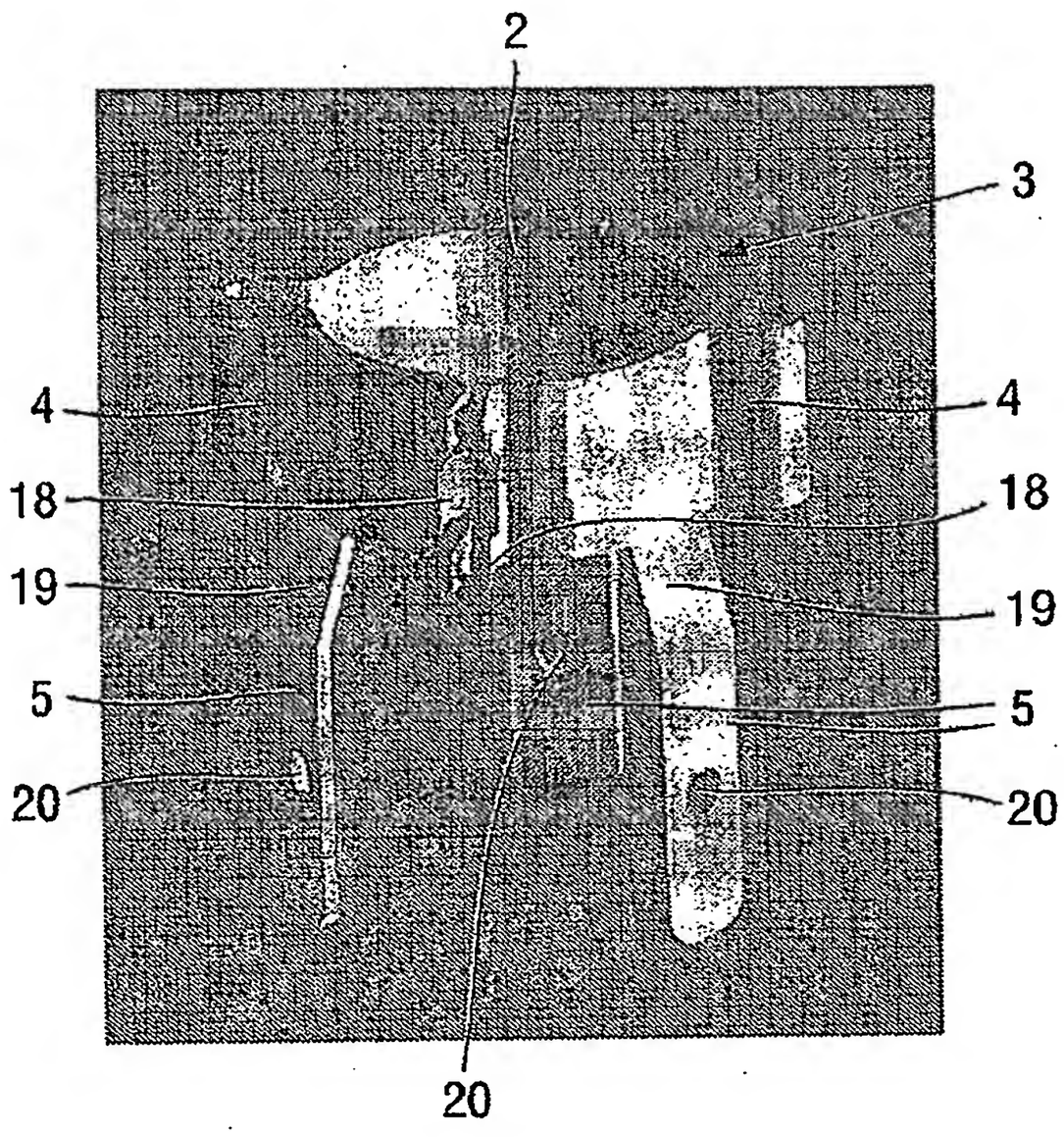

FIG.3

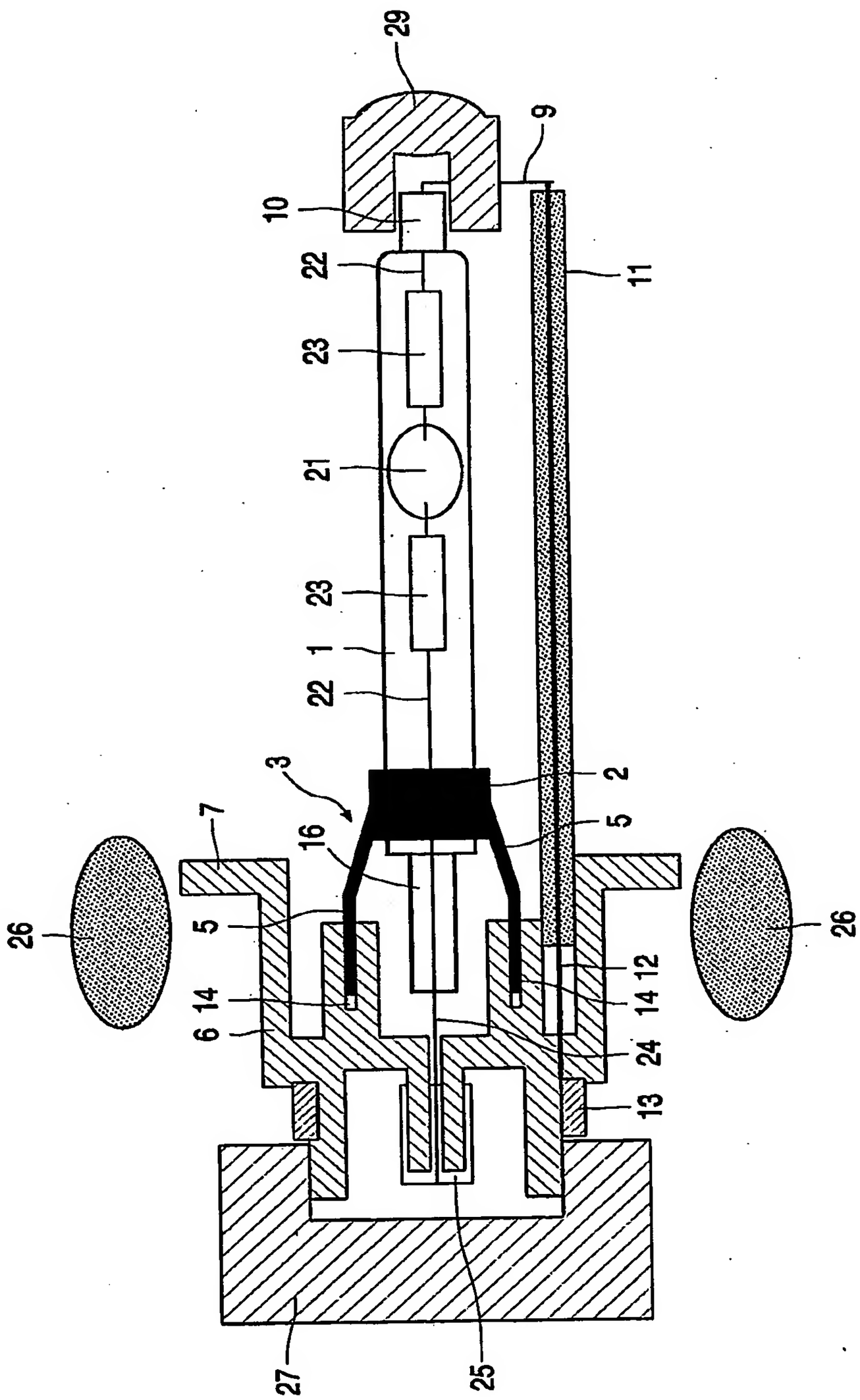

FIG. 4

A lamp and a method for attaching a burner to a cap of lamp

The invention is related to a lamp comprising a cap and a burner attached to the cap, whereby the burner and the cap are connected through a metal part, which part engages the burner. Such lamp, in particular a high-pressure discharge lamp, is for example suitable for use in mobile applications, such as for automotive headlights.

In general the burner of a lamp comprises a bulb of transparent glass enveloping means for generating light. Normally, the cap of the lamp is made of plastic material and is provided with electric guiding means for supplying electric power to the burner of the lamp. These guiding means comprise electric contacts that can engage corresponding contacts at the lampholder to which the cap can be connected.

For certain applications, such as automotive headlamps or lamps for projecting images on a screen, it is essential that the light source has an exact predetermined position with respect to the cap. Then the light source will have a predictable location after the cap is fixed in the lampholder. Furthermore, the connection between the burner and the cap must be stiff to avoid a relative movement of the burner with respect to the cap.

The object of the invention is a lamp, and a method for attaching a burner to the cap of a lamp, whereby the burner is attached to the cap in an effective and simple manner.

To accomplish with that object, said metal part, which part engages the burner, has at least two legs, and preferably three legs, whereby a portion of each leg engages a corresponding portion of the cap, said corresponding portion being of plastic material of the cap, whereby said portion of each leg has been heated in order to melt the plastic material and to deform it corresponding to the shape of the leg, whereby a mutual engagement of said portion of the leg and said corresponding portion of the cap is obtained. Melting the plastic material means that the material becomes weak enough to be deformed.

Such connection between said metal part and the cap is effective, because the shape of said portion of each leg and the shape of said corresponding portion of the cap will be complimentary after the melting of the plastic material, so that a complete engagement between said two portions is realized. Furthermore, such engagement can be realized while

the burner and the cap are kept in the desired position with respect to each other, which position will be maintained after the connection between the metal part and the cap is made.

The metal part can engage the burner of the lamp in several ways, but in one preferred embodiment said metal part comprises an annular portion surrounding a cylindrical portion of the burner, whereby said legs extend from said annular portion. Said annular portion can be connected to the burner through glue or another intermediary material, however, preferably the said annular portion includes spring means, so that said portion of the burner is engaged by said annular portion by clamping around said portion of the burner.

Preferably, the legs, or at least a portion of the legs, mutually diverge in the direction away from the burner. Thereby a stable support of the burner is created, also in case the legs itself are less stiff, or in case only two strip-like legs are present.

In one preferred embodiment, said legs are leaf springs, i.e. the legs have a strip-like shape and are made of resilient metal. So, when the material of the leg is heated, the spring force of the leave spring can press the relevant portion of the leg into the melted plastic material in order to achieve the required engagement. Furthermore, the force exerted by the leaf spring may press the portion of the leg against the engaging portion of the cap in order to maintain the engagement. Thereby a less complex shape or a less intensive engagement may be sufficient to keep said portions connected.

Preferably, said portion of each leg has a shape comprising one or more edges making an angle with respect to the longitudinal direction of the leg. The main force exerted on the connection between the leg and the cap will be in said longitudinal direction, and such edge, engaging the material of the cap, will resist such force easily.

In one preferred embodiment said portion of each leg comprise one or more holes, so that the plastic material of the cap can flow into that hole or holes when it is melted, resulting in an effective engagement.

The invention is furthermore related to a method for attaching the burner of a lamp to the cap of the lamp, whereby a metal part is fixed to the burner and said metal part is fixed to the cap, whereby the metal part has at least two legs, and in that – during fixation – the burner and the cap are kept in a predetermined position with respect to each other, whereby a portion of each leg abuts against a corresponding portion of the cap, said corresponding portion being of plastic material, whereby said portion of each leg is heated in order to melt the plastic material and to deform it corresponding to the shape of the leg, to obtain a mutual engagement of said portion of the leg and said corresponding portion of the cap.

In one preferred embodiment the said portion of the legs are heated by HR (high frequency) heating. Thereby the lamp, i.e. the burner and the cap, can be surrounded by a coil for generating a high frequency field in order to heat the relevant portions of the legs very fast to the required temperature. Such heating operation can take place in some seconds.

The invention will now be further elucidated by means of a description of an embodiment of a lamp, whereby reference is made to the drawing comprising figures, which are only schematic representations, in which:

Fig. 1 is a perspective view of the lamp;

Fig. 2 shows the burner at some distance from the cap of the lamp;

Fig. 3 is a perspective view of the metal part for connecting the cap and the burner; and

Fig. 4 is a sectional view showing the fixation of the burner to the cap.

Figure 1 shows a lamp comprising a substantial cylindrical burner 1. The lower part of the burner 1 is surrounded by the substantial annual portion 2 of a metal part 3. The annual portion 2 engages the burner 1 by a clamping action caused by two curved parts 4 of the annual portion 2, which curved parts 4 function as spring means. The metal part 3 also comprises three legs 5 extending downwardly.

The lamp furthermore comprises a cap 6, substantially made of plastic material. At its upper side the cap 6 is provided with a flange 7, extending in a radial plane. As is shown in figure 1, each of the three legs 5 of the metal part 3 is connected to the cap 6.

The lamp is a high-pressure discharge lamp with a double-ended burner 1, i.e. both ends of the burner are provided with electric guiding means for supplying electric power to the light source in the burner 1. Figure 1 shows the electric guiding means at the higher end 8 of the burner 1. These guiding means comprise a metal wire 9. A portion of the metal wire 9 is located in a tubular part 10 of the burner 1 and another portion of the wire 9 is located in the tubular member 11, which member 11 extends in axial direction at a distance from the burner 1. Tubular member 11 is fixed in a bore 12 in the cap 6, and wire 9 is connected to an electric contact 13 at the lower side of cap 6.

Figure 2 shows the burner 1 and the cap 6 at some distance from the burner 1. The cap 6 is provided with three holes 14 to accommodate the ends of the three legs 5. The

shape of the holes 14 corresponds to the shape of the ends of the legs 5, but after the legs 5 are inserted into the holes 14 there is enough play between the legs 6 and the holes 14 to allow some movement of the metal part 3 with respect to the cap 6.

Furthermore, cap 6 is provided with a cylindrical bore 12 to accommodate the lower end of tubular member 11. The shape of the bore 12 corresponds to the shape of the lower end of member 11, so that tubular member 11 is kept in its axial position after it is inserted into the bore 12.

Figure 2 shows also the tubular part 16 of the burner 1, extending coaxially at the lower end of the burner 1. This tubular part 16 is located between the legs 5 and accommodates the electric guiding means at the lower end of the burner 1.

Figure 3 shows the metal part 3 in more detail. The metal part 3 has a substantial annular portion 2, which portion can surround a part of the burner 1. After the annual portion 2 is applied to the burner 1, the annual portion 2 can be closed by attaching the two radial extending portions 18 to each other. The two portions 18 can be connected by mechanical engagement or by a spot welding operation. The two curved parts 4 act as spring means, so that the burner 1 is firmly engaged by the annular portion 2 of the metal part 3 after the annular portion 2 is closed.

The metal part 3 also comprises three legs 5 extending downwardly. Portions 19 of the legs 5 mutually diverge in the direction away from the burner 1. Near the ends of each leg 5 there is a hole 20 in the strip-like material of the leg 5. The ends of the legs 5 can also be provided with other recesses forming edges of the material in a direction inclined to the longitudinal direction. Such edges improve the engagement with the portion of the cap 6 abutting such edge.

Figure 4 is a sectional view showing the lamp and means for keeping the burner 1 and the cap 6 of the lamp in the required position during establishing the fixation of the burner 1 with respect to the cap 6.

Figure 4 shows the burner 1 comprising a space 21 where the light is generated. Electric power is supplied to said space 21 through wires 22 and xxxxxx 23, as is usual for a high-pressure discharge burner. Both ends of the burner 1 are provided with a tubular parts 10,16 accommodating the metal wires for supplying electric power to the burner 1. At the right side of the burner 1 tubular part 11 encloses metal wire 9, which wire 9 is further guided through tubular member 11 to the cap 6 of the lamp. In the cap 6 the wire 9 is connected to electric contact 13 surrounding a portion of the cap 6.

At its left side the burner 1 is provided with tubular part 16 enclosing metal wire 24. In cap 6 wire 24 is connected to electric contact 25 in the central part of the cap 6. Apart from the metal contacts 13,25 the cap is made of plastic material. When the lamp is placed in a lampholder, the lampholder engages the cap 6 of the lamp and the contacts 13,25 make contact with corresponding electric contacts in the lampholder.

Figure 4 also shows the metal part 3 having an annular portion 2 surrounding a portion of the burner 1. Figure 4 shows a metal part with only two legs 5. The legs 5 are inserted in holes 14 in the plastic material of the cap 6. The fixation of the legs 5 of the metal part 3 in the holes 14 of the cap 6 is executed by a high frequency treatment by means of the HF source 26 located around the cap 6. The HF source 26 is heating the legs 5, so that the plastic material of the cap 6 surrounding the leg 6 melts and flows into hole 20 (see figure 3) in the material of the leg 5. After cooling down, the leg 5 is firmly fixed in hole 14, so that the burner 1, to which the metal part 3 was already fixed, is connected to the cap 6.

During the fixation operation the burner 1 and the cap 6 are both maintained in an exact predetermined position with respect to each other. Therefore the cap 6 is engaged by a tool 27 and the burner 1 is engaged by a tool 29. Both tools are represented in figure 4 in a very schematic manner. During the fixation operation light can be generated in the burner 1, so that the exact location of the generated light can be detected. Thereby the burner 1 can be fixed to the cap 6 in such way that the light source is located at an exact predetermined position with respect to the cap 6, and also to the a lampholder, in case the cap 6 is fixed to that lampholder in an exact predetermined position. Such exact position may be required to obtain an exact position of the light source with respect to a reflector, as is the case in a head lamp of a car.

The embodiment of the lamp as described above is only an example; a great many other embodiments are possible, including embodiments with other types of lamps.

CLAIMS:

1. A lamp comprising a cap (6) and a burner (1) attached to the cap, whereby the burner (1) and the cap (6) are connected through a metal part (3), which part (3) engages the burner (1), characterized in that the metal part (3) has at least two legs (5), whereby a portion of each leg (5) engages a corresponding portion of the cap (6), said corresponding portion being of plastic material, whereby said portion of each leg (5) has been heated in order to melt the plastic material and to deform it corresponding to the shape of the leg (5), whereby a mutual engagement of said portion of the leg (5) and said corresponding portion of the cap (6) is obtained.

2. A lamp as claimed in claim 1, characterized in that said part (3) has three legs (5).

3. A lamp claimed in any one of the preceding claims, characterized in that said metal part (3) comprises an annular portion (2) surrounding a portion of the burner (1), whereby said legs (5) extend from said annular portion (2).

4. A lamp as claimed in claim 3, characterized in that said annular portion (2) includes spring means (4), so that said portion of the burner (1) is engaged by said annular portion (2) by clamping.

5. A lamp as claimed in any one of the preceding claims, characterized in that at least a portion of the legs (5) mutually diverge in the direction away from the burner (1).

6. A lamp as claimed in any one of the preceding claims, characterized in that said legs (5) are leaf springs.

7. A lamp as claimed in any one of the preceding claims, characterized in that said portion of each leg (5) has a shape comprising one or more edges making an angle with respect to the longitudinal direction of the leg (5).

8. A lamp as claimed in any one of the preceding claims, characterized in that said portion of each leg (5) comprise one or more holes (20).

9. A method for attaching the burner (1) of a lamp to the cap (6) of the lamp, whereby a metal part (3) is fixed to the burner (1) and said metal part (3) is fixed to the cap (6), characterized in that the metal part (3) has at least two legs (5), and in that – during fixation – the burner (1) and the cap (6) are kept in a predetermined position with respect to each other, whereby a portion of each leg (5) abuts against a corresponding portion of the cap (6), said corresponding portion being of plastic material, whereby said portion of each leg (5) is heated in order to melt the plastic material and to deform it corresponding to the shape of the leg (5), to obtain a mutual engagement of said portion of the leg (5) and said corresponding portion of the cap (6).

10. A method as claimed in claim 8, characterized in that the said portion of the legs (5) are heated by HR (high frequency) heating.

ABSTRACT:

A lamp comprising a cap (6) and a burner (1) attached to the cap, whereby the burner (1) and the cap (6) are connected through a metal part (3), which part engages the burner (1). The metal part (3) has at least two legs (5), preferably three legs (5), whereby a portion of each leg engages a corresponding portion of the cap (6). Said corresponding portion is made of plastic material. Said portion of each leg (5) has been heated in order to melt the plastic material and to deform it corresponding to the shape of the leg, whereby a mutual engagement of said portion of the leg (5) and said corresponding portion of the cap (6) is obtained.

Fig. 1